

CHAPTER 3: A SYSTEMATIC APPROACH

This chapter presents a generic EMS framework that incorporates the three ongoing loops—planning, corrective action, and continuous improvement—introduced in Chapter 2. The principles embodied in existing models, such as EPA’s Code of Environmental Management Principles (CEMP), ISO Standard 14001, and OPNAVINST 5090.1B serve as a basis for this generic framework, which may be used by Navy installations in a systematic approach to enhancing their EMS in support of the EQA program.

Many of the components and elements of this framework are in place at Navy installations, as prescribed in OPNAVINST 5090.1B (see Table 2-2). Full implementation of the generic EMS framework will enhance environmental performance and promote attainment and maintenance of compliance by 1) highlighting and encouraging essential activities and procedures and 2) focusing management attention and resources on priorities established by the installation.

Figure 3-1 depicts an overview of the EMS framework illustrating the three generic loops. Sections 3.1 through 3.3 describe each loop in detail.

3.1 The Planning Loop—Determining Environmental Impacts

The most effective EMS focuses resources where they are most needed. To understand where to apply resources, an installation will benefit from a current and comprehensive inventory of its regulatory requirements, business and management practices, and the relative impacts of its activities on the environment and other vulnerable assets. Since business and management practices at Navy installations are subject to the dynamic nature of mission, funding, personnel, and environmental requirements, the inventory should be reviewed and revised on a periodic basis. The planning process is thus described as a “loop”—it is done repeatedly and supports continuous improvement.

An effective planning loop addresses environmental impacts and responsibilities across functional boundaries at the installation and is critical in the development of a comprehensive, installation-wide EMS.

A mature EMS is characterized by identification of practices, vulnerable assets, and impacts *across the entire installation*, irrespective of functional lines. Thus, practices, vulnerable assets, and impacts identified during planning should be rigorously documented. In this respect (and as discussed in Chapters 4 and 5 on the design of internal and external assessments) inventory information developed during the planning process will contribute significantly to the success and continuous improvement of the EQA program.

Figure 3-2 illustrates the relationship between vulnerable assets, business and management practices, and associated impacts.

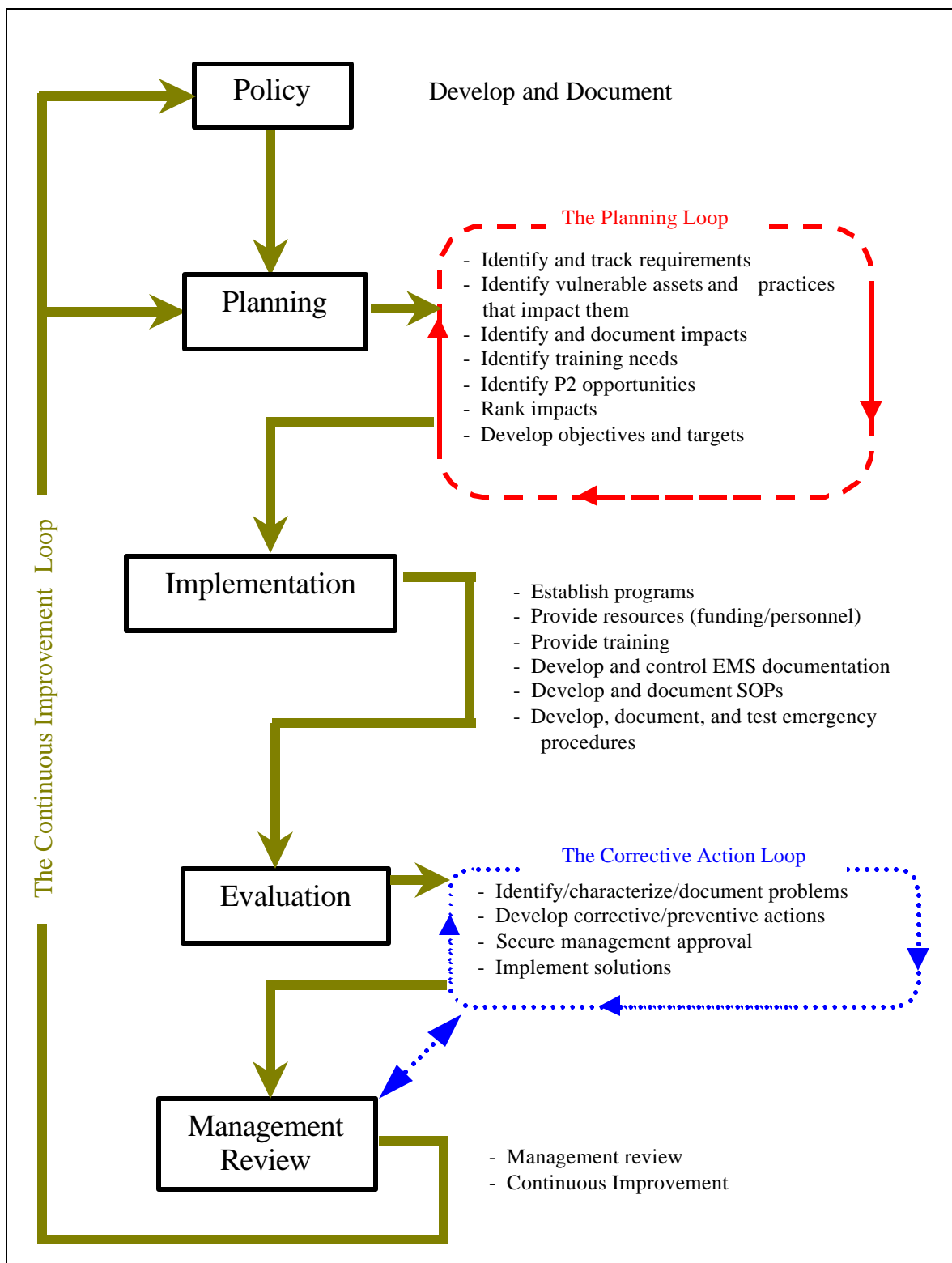


Figure 3-1: Generic EMS Process

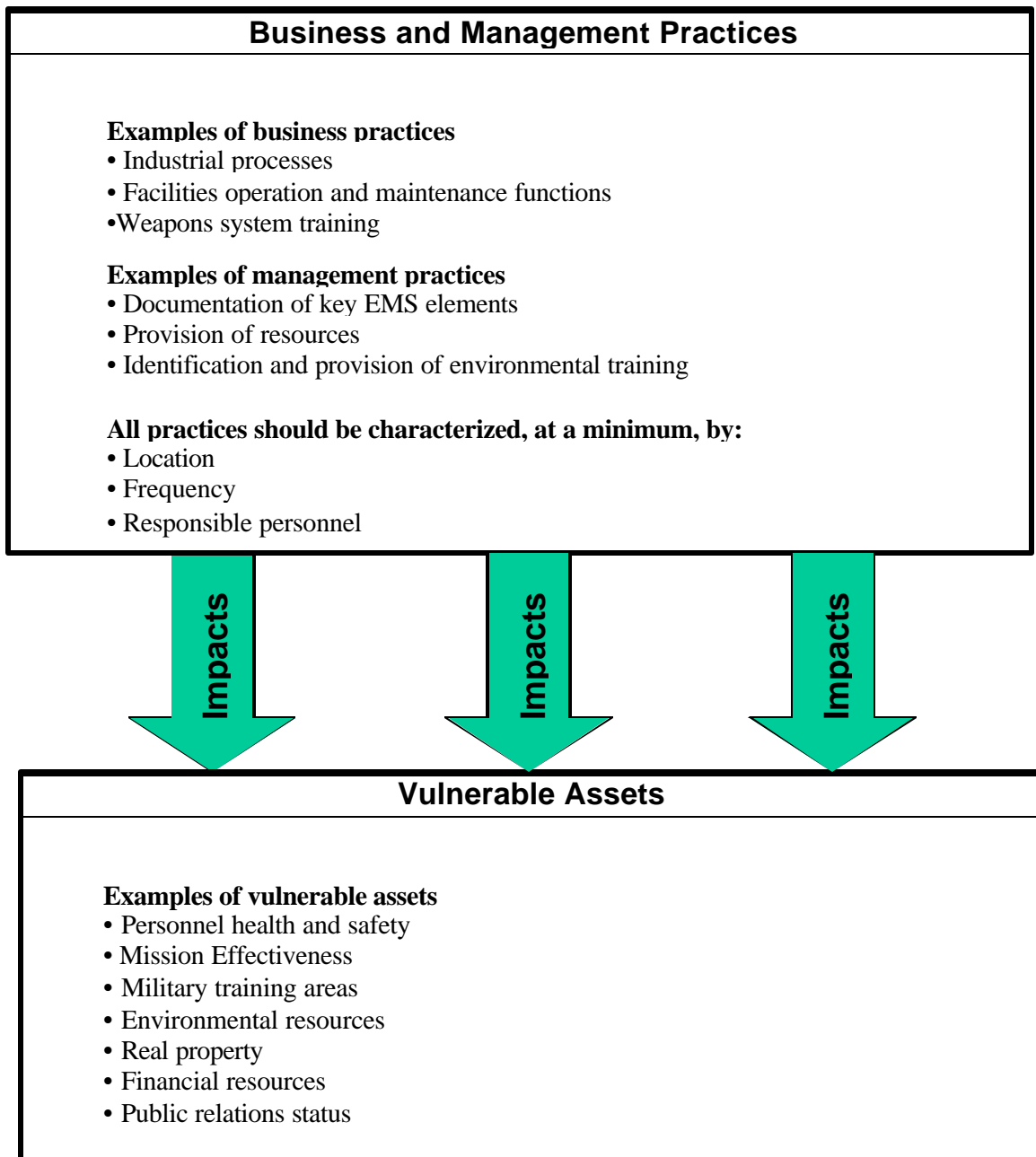


Figure 3-2: Relationships between Business and Management Practices, Impacts, and Vulnerable Assets

Components of the planning loop depicted in Figure 3-1 include:

1. *Identify and Track Legal, Regulatory, and Other Requirements*—Because regulatory compliance is the minimum goal of a performance-based EMS, identifying and tracking

legal, regulatory, DoD, DoN, Final Governing Standard, Status of Forces Agreements, and Overseas Environmental Baseline Guidance Document requirements remains key. Because new requirements are developed, and existing requirements change, tracking requirements must be done on a continuous basis.

2. *Identify Practices and Vulnerable Assets*—“Practices” are defined broadly to include everything that an installation does that has an actual or potential impact on its resources. At a minimum, practices include the following:

- Business practices that have actual or potential environmental impacts including, but not limited to, operation and maintenance of industrial processes, pollution control equipment, mission-critical equipment, and facilities.
- Management practices that have actual or potential environmental impacts including, but not limited to:
 - > Provision of environmental training for personnel;
 - > Documentation of EMS-related activities;
 - > Execution of the environmental project funding process; and
 - > Implementation of management plans and procedures.

While conducting its inventory of practices, the installation should also identify where each practice takes place, the frequency of its occurrence, and responsible personnel. As a starting point, this information is compiled from existing sources including plans, permits, inventories, program managers’ knowledge, practice owners’ knowledge, etc. Subsequently, any gaps are filled in.

“Vulnerable Assets” are also defined broadly to include:

- Personnel health and safety;
 - Mission effectiveness;
 - Military training areas;
 - Sensitive environmental, historical, and cultural resources;
 - Real property;
 - Financial resources; and
 - Public relations status.
3. *Determine and Document Impacts*—“Impacts” are the effects of conducting business and management practices on the installation’s vulnerable assets. Determination of impacts is based on the identification of practices and sensitive assets described above. Note that each practice may impact one or several assets in multiple ways. Impacts should be documented as they are identified. Examples include:
 - The operation of an oil/water separator may impact the quality of waters (an environmental asset) receiving the separator’s discharge.
 - Air emissions from a large, highly visible power plant impact local and regional air quality and may also impact the installation’s public relations status.

- Failure to provide effective environmental training to operators at the power plant could impact air, water, and other environmental media. In this example, internal and external assessments (and problem solving techniques) might identify a training deficiency in the management system as a root cause of identified non-compliance events.
 - Operation of a solvent-based industrial parts washer generates hazardous wastes (HW) that must be disposed of. Transportation and disposal of HW create potential environmental impacts and real financial impacts. Operation of the parts washer also potentially impacts worker health and safety.
4. *Identify P2 Opportunities*—Identifying P2 opportunities follows naturally from a comprehensive identification of impacts. The identification, selection, and implementation of P2 technologies can not only reduce compliance liabilities, but can also improve operational and fiscal efficiency. While operational and financial efficiencies are important, however, the primary benefit of a P2 approach in an EMS is its ability to provide optimal control over certain environmental impacts by eliminating the impacts (and associated compliance requirements) entirely.

When total costs are considered, the elimination of a compliance requirement altogether may provide stronger control over a practice and its impacts than will improved management of the requirement. This is the basic approach of several initiatives underway among the DoD components (e.g., U.S. Navy's AIMM to Score program, U. S. Marine Corp's P2 Approach to Compliance Efforts (PACE) program, and Air Combat Command's Compliance through Pollution Prevention (CTP2) initiative), which seek to eliminate "compliance sites" through the use of P2 solutions.

5. *Rank Impacts*—Prioritizing impacts is crucial to the EMS process and should be based on development and use of a ranking scheme that assesses the relative significance of (or risks associated with) each impact. Significance is determined per criteria developed by the installation. Examples of possible criteria for consideration include:
- How frequently does the impact occur?
 - Is the impact currently under control?
 - Is the impact a recurring, continuous, or discrete event?
 - What is the probability of occurrence?
 - Does the impact affect more than one asset?
 - What is the importance/sensitivity of the affected asset?
 - Is the associated practice subject to regulatory requirements?
 - What is the potential for regulatory agency involvement?
 - What is the potential to impact sensitive assets?
 - How likely is negative (or positive) public (or other stakeholder) attention?
 - What is the potential to endanger employee health?

Practices and impacts subject to regulatory requirements or scrutiny should automatically be given high priority. Otherwise, it is up to installation-level EMS planners to determine how to prioritize impacts. It is important to include practice owners—those personnel or units

who directly control a business practice—as well as environmental managers in the identification and ranking of impacts. The impact ranking process should consider the interests of as broad a spectrum of stakeholders as is feasible.

In order to communicate the results of the impact ranking process, installations may want to consider a model such as NAVOSH's Risk Assessment Code (RAC) described in OPNAVINST 5100.23E, Chapter 12, "Hazard Abatement Program." The RAC is an expression of risk assigned by a matrix which combines the elements of hazard severity and mishap probability.

6. *Develop Objectives and Targets*—A fundamental goal of an EMS is to continuously improve environmental performance. Performance is measured with respect to the installation's status in meeting internally-developed objectives and targets. Objectives and targets should reflect priorities based on the installation's inventory of business and management practices and associated impacts on vulnerable assets.

Objectives must also support compliance and must be measurable, i.e., EMS planners should develop metrics to facilitate measurement of performance improvement attributable to the EMS. Table 3-1 presents examples of objectives and targets derived from an organization's planning inventory.

Table 3-1: Examples of Impacts, Objectives, and Targets			
Priority Impact	Affected Asset(s)	Objective	Target
High cost of hazardous waste disposal	Financial resources	1) Reduce costs of HW disposal 2) Implement P2 solutions	1) 30% cost reduction by FY2002 2) Five P2 projects in next budget request
Wastewater treatment plant discharge	Water quality	Reduce NPDES permit exceedances	50% reduction by FY2000
Shop floor worker safety	Personnel health and safety, financial resources, mission effectiveness	Reduce accidents and spills	50% reduction in days lost to accident-related injuries by FY2000
Power plant stack emissions extensively degrade public image	Public relations	Reduce public disfavor	Participate in community environmental planning committee

Once the six steps of the planning process are completed, installation personnel should collate all documentation developed during each of the steps. Other data, such as responsible personnel, applicable requirements, reporting responsibilities, etc., can be included in the inventory, at the installation's discretion. A comprehensive inventory becomes an integral tool for conducting the internal and external assessments, as discussed in Chapters 4 and 5 respectively. The inventory also supports continuous improvement by providing a baseline for revisiting the planning loop as the installation's EMS matures. Table 3-2 presents a summary of types of information that may be developed and documented during EMS planning.

**Table 3-2: Information Developed and Documented
in the EMS Planning Process**

Critical Information	List all vulnerable assets. List all business practices with actual or potential impacts. List management practices that influence actual or potential impacts. List regulatory requirements that apply to each practice and asset. Describe the location and “owner” of each practice and asset, as applicable. Identify business and management practices subject to compliance requirements. Describe impacts to assets associated with each practice. Prioritize impacts per criteria developed by installation and Major Claimant.
Supporting Information	Identify key personnel and points of contact associated with each practice and asset. Identify key documents maintained for each practice and asset. Describe training requirements for each practice and asset. Maintain training records for all personnel in jobs requiring environmental training. Describe practice. Describe P2 solutions in place or applicable to each practice. Describe environmental projects underway for each practice and asset. Describe the regulatory history associated with each practice and asset.

3.2 The Corrective Action Loop

Effective implementation of the corrective action loop enables an installation’s environmental programs or EMS to become “self-correcting” and promotes evolution beyond a reactive, compliance-focused stance. An effective corrective action process also allows installations to document their ability to identify non-compliance issues and to develop and implement appropriate solutions. The corrective action loop consists of several steps:

1. *Identify Deficiencies/Problems*— The EQA Program’s internal and external assessments identify compliance deficiencies and associated opportunities for improvement within the installation’s environmental programs or EMS. The installation and/or Major Claimant set evaluation criteria depending on the maturity of the installation’s environmental programs, and evaluators collect objective information based on document reviews, inspections, and interviews with appropriate personnel.
2. *Characterize Deficiencies/Problems*— Characterization of identified deficiencies is a continuation of the fact-finding initially conducted to identify problems. Characterization consists of collecting additional information to support a more complete understanding of the deficiency and its underlying causes. Systemic causes of environmental management and compliance problems may be identified through root cause analysis² and problem solving techniques (see Chapter 6 of this guide).

All information about identified EMS or compliance problems should be documented to support the development of corrective and preventive actions and management review of recommended solutions.

² Root cause analysis within the internal assessment is a component of the “problem solving” techniques discussed in Sections 4.3, 5.3, and Chapter 6 of this guide. Root cause analysis exceeds DoD’s requirements for “root cause categorization” outlined in the DUSD(ES) memorandum, *Root Cause Analysis Methodology and Implementation*, 23 April 1997.

3. *Develop Corrective/Preventive Actions*—The installation should develop corrective or preventive actions that address the causes of problems and seek to prevent the recurrence of compliance or management system deficiencies. Root causes may often indicate shortcomings in the underlying management system; management system-related causes of non-compliance indicate opportunities for improvement of the EMS.
4. *Management Approval*—In addition to responsibilities for periodic review of the entire EMS (discussed in Section 3.3 below), top management personnel are also responsible under the EMS framework for approving corrective/ preventive actions developed to solve identified problems or deficiencies. Management review and approval of recommended solutions constitutes “buy-in” and significantly enhances the effectiveness of solutions that are implemented.
5. *Implement Solutions*—After preventive and corrective actions have been developed and approved, they must be implemented to support continuous improvement. Solutions designed to solve the causes rather than the symptoms of compliance or management system deficiencies contribute to long term enhancement of the EMS. Measurement of improvements attributable to implemented solutions is critical to documentation of continuous improvement, and should begin shortly after implementation is initiated. For a discussion of review and revision of the entire EMS by senior management personnel, see Section 3.3.

3.3 The Continuous Improvement Loop

Continuous improvement in environmental performance is a fundamental goal of the EMS approach. The continuous improvement loop encompasses the entire EMS process, including the planning loop (Section 3.1), the corrective action loop (Section 3.2), and several other supporting elements. This section discusses each part of the continuous improvement loop (the entire EMS framework).

1. *Develop and Document Environmental Policy*—Senior management is responsible for defining an environmental policy appropriate to the installation’s mission. This policy must provide vision or direction for the EMS, typically articulated through basic performance goals. The policy should indicate the installation’s commitment to continual improvement, pollution prevention, and compliance with regulations. It should also provide a framework for setting and reviewing goals, objectives, and targets. Additionally, management should ensure that the policy is maintained, documented, and communicated to all employees.
2. *The Planning Loop*—Section 3.1 above discusses the periodic planning process. EMS planning should support the installation’s environmental policy and lead to the development of initiatives or programs in the implementation component. EMS planners should also seek the input of various functional organizations across the installation who “own” business practices that have environmental impacts. Cross-functional coordination facilitates the integration of environmental planning with planning among other functional areas at the installation.
3. *Implementation*—Senior management is responsible for developing the capabilities and support system required to achieve the installation’s environmental policy. Implementation includes appointing personnel with defined roles, responsibilities, and authority for establishing the EMS and ensuring it is implemented and sustained. Implementing the EMS

also includes providing resources to address the financial, technical, training, and material requirements. Other important elements of EMS implementation address the need for documenting key aspects of the EMS, as well as maintaining environmental records. Documentation should include written procedures and operating criteria for all practices and impacts identified in the EMS planning process.

4. *The Corrective Action Loop*—Section 3.2 above discusses the corrective action process that identifies instances of non-compliance and their root causes and that develops solutions appropriate to those causes. Since effective compliance management is a component of overall environmental management, an understanding of the effectiveness of the corrective action process is critical to management's evaluation of the EMS.
5. *Periodic Management Review of EMS*— Chapter 2 discusses the EMS Review, which evaluates the management system's ability to enhance environmental performance (including the ability to attain and maintain compliance). Both the compliance assessment and the EMS Review are key to the continual improvement process. The results of evaluation and measurement should be provided to management personnel to support their review of the EMS. Management's actions in response to the results of compliance and management evaluations, in particular the revision of policy, programs, and procedures, enable continual improvement.

Using the results of EMS evaluations, management personnel review the performance of the EMS with respect to its objectives. Essentially, management considers whether the EMS is achieving what it was established to achieve. If objectives have been met, new objectives may be established, or new targets may be developed for existing objectives. If objectives have not been met, management personnel should determine how EMS performance could be improved. At a Navy installation, appropriate management personnel to participate in a Management Review include the Commanding Officer, Public Works Officer, and other department heads. In a regional complex, the Regional Commander's Regional Advisory Board would be appropriate reviewers.

6. *EMS Improvement*— Improvements to the EMS are achieved through revision to policy, plans, procedures, and/or objectives and targets by management personnel based on their review of performance measurement results. The EMS is thus cyclic, with continuous review and revision of elements of the management framework based on the periodic review of regular performance measurements.

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